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ABSTRACT

The study compared the language development of 72 learning disabled (LD) and 72 normal students at intermediate and secondary age levels (9-12 and 12-15 years of age). Ss were asked to respond to questions after viewing two films, and oral language samples were tape recorded and analyzed to examine syntactic and vocabulary development. Results supported the hypothesis that predicted significant differences between LD and normal Ss on three measures of syntactic development but did not support the hypothesis that predicted significant differences on four measures of vocabulary development. A significant linear trend among the age levels was noted for syntactic density scores. Possible reasons for findings are considered, including the effects on vocabulary findings of stimulus materials, research strategy, and measures used. Implications noted include the importance of providing opportunities for meaningful, diverse language to occur in the classroom. (CL)

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FINAL REPORT
U.S.O.E. Grant No. G007900009
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Disabled and Normal Students at
Intermediate and Secondary Age Levels

Submitted to:

RESEARCH PROJECTS BRANCH
DIVISION OF INNOVATION AND DEVELOPMENT
BUREAU OF EDUCATION FOR THE HANDICAPPED
UNITED STATES OFFICE OF EDUCATION

BY:

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Area of Special Education
College of Education
The University of Alabama
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January 30, 1980

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W. D. C.

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INTRODUCTION

Introduction to Problem

Language is an important aspect of development in children and youth. Luria (1961) proposed that language functions as a second signal system in man, with all primary sensory information processed through language, the second signal system. Lefevre indicated that an individual's language is the essential socio-psychological bond that makes him one with his culture (1970). McGrady (1968) viewed language as that which makes man Man. He suggested that a language disorder may make man less than a man.

Children and adolescents with learning disabilities manifest a variety of language problems. According to McGrady (1968), the greatest prevalence of learning disabilities is that in which language is involved. Semel and Wiig (1975) stated that recent research shows a greater incidence of language deficits in learning-disabled children than previously had been assumed. In a review of research on language problems of learning-disabled students, Andolina (1978) found that the language of learning-disabled children is characterized by grammatically incorrect sentences,

limited use of syntactic structures, limited vocabulary, and frequent use of fillers such as and, then, now, and um.

Delayed or disordered language development can occur at any developmental stage. Yet, the great majority of research on language development and disorders has been directed at the birth to eight-year age range. Several factors may account for this emphasis. First, predominant language theories have emphasized the importance of the first five or six years of life in the development of language (Carroll, 1960; Chomsky, 1965). Secondly, most standardized measures of language are characterized by normative data which extend only through chronological age nine or ten, e.g., Northwestern Syntax Screening Test (Lee, 1969); Test of Language Development (Newcomer, Goodman, & Hammill, 1978); Test for Auditory Comprehension of Language (Carrow, 1973).

Recently, distinctions have been made between research on language acquisition and research on language development. Hunt (1970b) pointed out that studies of language acquisition involve small numbers of subjects, emphasize the birth to six-year age range, test hypotheses based on theory, and frequently elicit and analyze specific grammatical structures. Language development studies utilize larger numbers of subjects, emphasize the range beyond age six, analyze spontaneous oral language samples, and are designed to inventory and describe language development. A major purpose of language development

research is to provide a baseline for normal language development and provide a basis for comparison of deviations in language development. Since learning-disabled students exhibit a wide range of language problems, language development studies are crucial in gaining insight into the language functioning of learning-disabled students, particularly at the intermediate- and secondary-age ranges.

Studies of language development have been influenced by predominant theories of language during different eras. Measurement has evolved from simple methods to quite complex strategies. Starting with the simple counting of words and sentences, measurement techniques have progressed to ratios, various types of language units, formulae, and other indices, some of which employ computer technology (Golub & Frederick, 1970; Kidder, 1974). The minimal communication unit, referred to as the T-unit (Hunt, 1965), has evolved as a measure of syntactic development among school-age children. Vocabulary development frequently has been measured by type-token ratios or measures of vocabulary diversity (Kidder, 1974).

Rationale for Study

Research indicates that children and adolescents with learning disabilities manifest a variety of language problems. McGrady (1968) stated that the greatest prevalence of learning disabilities is that in which language is involved. More recently, Semel and Wiig (1975) reported that research shows a greater incidence of language

deficits in learning-disabled children than previously had been assumed. While disordered language development can occur at any age, most research on language development has focused on the birth to eight-year age range and has examined primarily language acquisition rather than language development. In descriptive studies, O'Donnell, Griffin, and Norris (1967), Fox (1970), and Ciani (1974) examined language development in normal children through the analysis of spontaneous oral language samples. Andolina (1978) used procedures similar to those used by the above-mentioned investigators with a population of learning-disabled children, and compared her results to theirs. These studies focused chiefly on children in the primary grades. Additional research is needed which compares the language of learning-disabled and normal children from the same school populations and which extends the grade level of subjects into the intermediate and secondary grades.

Statement of Problem

Four studies have been conducted employing the T-unit as a measure of syntactic development along with various measures of vocabulary development (Andolina, 1978; Ciani, 1974; Fox, 1970; O'Donnell, Griffin, & Norris, 1967). While these studies provided some indication of trends in syntactic and vocabulary development, only one study involved learning-disabled children (Andolina, 1978). Results from Andolina's study were compared with the other three studies; but subjects were from widely differing

geographical areas, and studies which were compared spanned more than ten years. Results from Andolina's study also indicated a slight decline for secondary-age learning-disabled subjects on some measures of syntactic and vocabulary development. However, the same oral language stimulus was used with the youngest age range (i.e., 7.6 years to 9.0 years) as the oldest age range (i.e., 12.1 years to 13.5 years). The decline may have been a function of the stimulus employed rather than a trend in language development of learning-disabled students at secondary-age levels. Additional research is needed which (a) compares the language development of learning-disabled and normal students from the same school populations; (b) extends the chronological age range and grade level of subjects into the secondary school; and (c) employs stimulus materials more appropriate for intermediate- and secondary-age students. Similar recommendations for research were proposed by Andolina (1978, pp. 96-99).

The purpose of this study was to compare the language development of learning-disabled and normal students at two intermediate- and two secondary-age levels. Aspects of language development involve the measures of syntactic development and vocabulary development used in the studies of language development previously cited and as analyzed from oral language samples. Age ranges include 9.1 to 10.5-year olds, 10.6 to 12.0-year olds, 12.1 to 13.5-year olds, and 13.6 to 15.0-year olds. Stimulus materials

appropriate for this age range were used. In addition, developmental trends in syntactic development and vocabulary development for both learning-disabled and normal children were analyzed. Finally, results from previous studies were compared to results from this study.

Hypotheses

The following hypotheses were examined in this study:

1. There is a significant difference between learning-disabled and normal children at two intermediate- and two secondary-age levels in syntactic development as measured by (a) the number of T-units, (b) the average number of words per T-unit, and (c) the Syntactic Density Score.

2. There is significant difference between learning-disabled and normal children at two intermediate- and two secondary-age levels in vocabulary development as measured by (a) the number of different words spoken (word types), (b) the simple type-token ratio, (c) the corrected type-token ratio, and (d) the Vocabulary Intensity Index.

In addition to these hypotheses, developmental trends of syntactic development and vocabulary development for both the learning-disabled population and the normal population were examined and compared.

Definition of Terms

For the purpose of this study, the following terms are defined:

Children with learning disabilities. Children with special learning disabilities exhibit a disorder in one or more of the basic psychological processes involved in understanding or using spoken or written language. These may be manifested in disorders of listening, thinking, talking, reading, writing, spelling, or arithmetic. They include conditions which have been referred to as perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia, developmental aphasia, etc. They do not include learning problems which are due primarily to visual, hearing, or motor handicaps, to mental retardation, to emotional disturbance, or to environmental disadvantage.

Normal children. Children who are not currently enrolled in any special education program, have not previously been enrolled in any special education program, and do not manifest a severe speech disorder.

Intermediate-age levels. Nine to twelve years of age.

Secondary-age levels. Twelve to fifteen years of age.

T-unit. A minimal terminal unit consisting of a main clause and its subordinate clauses.

Syntactic Density Score. A score based on ten variables which correlate highly with teacher judgment of children's writing. Weights are assigned to each variable according to its contribution, then frequencies are counted and

weighted. The resulting product is divided by the number of T-units.

Simple type-token ratio. Ratio between the number of different words spoken and the total number of words spoken.

Corrected type-token ratio. The number of word types divided by the square root of twice the number of word tokens.

Vocabulary Intensity Index. Comprised of level of vocabulary difficulty, diversity of vocabulary, number of multisyllabic words, and word building.

Significance of the Study

Several educational implications may be derived from this study. An adequate description of trends in normal language development is critical in order to better understand the deviations from normal language development exhibited by the learning-disabled child. A better understanding of the language development and deviations of the learning-disabled student is important for several reasons. First, the Federal Register for December 29, 1977, reported guidelines for the identification of specific learning disabilities. Oral language was listed as one of seven aspects of development or achievement in which a learning-disabled child might exhibit a severe discrepancy, thus indicating identification of a specific learning disability. Since most standardized measures of language have norms only up to chronological age nine or ten, determination of

a severe discrepancy in oral language presents a challenge to diagnosticians and educators concerned with identification of learning-disabled students in the intermediate- and secondary-age ranges.

A second major benefit which may be derived from the present study involves educational programming. Since little is known about developmental trends in language development of intermediate- and secondary-aged learning-disabled students, teachers lack focus for language development activities at those age ranges. Results from the present study might benefit teachers in considering syntactic development and vocabulary development as foci for enhancing both receptive and expressive aspects of language.

A third benefit from the present study involves the potential for development of assessment strategies and materials which might be employed by teachers in identifying language deficits and in evaluating progress through the monitoring required in Public Law 94-142, Education for All Handicapped Act.

REVIEW OF LITERATURE
AND RELATED RESEARCH

Overview

Modern research in the United States concerned with oral language development in normal children began in the 1900s. The Gates in 1900, Bateman in 1914, Synder in 1914, the Brandenburs in 1916, and Nice in 1917 conducted studies looking at vocabulary growth and parts of speech. They concluded that their subjects showed a marked variety in the development of these two aspects of oral language. Since these studies occurred prior to the advent of controlled studies, and the subjects were usually the investigators' own children, the results were not generally applicable (Andolina, 1978).

Controlled studies, utilizing representative sampling and systematic data gathering, began in the 1920s. Research concerning normal language development since that time has generally been divided into three theoretical eras: (a) the Traditional Grammar Era, (b) the Structural Grammar Era, and (c) the Transformational Grammar Era (Ciani, 1974; Fox, 1970; O'Donnell, Griffin, & Norris, 1967). Results of research in the first two eras will be

summarized briefly, while literature in the third period, which is significant to the present study, will be examined in greater depth.

Traditional Grammar Era

According to grammarians in the Eighteenth Century, Latin was the most logical language; therefore, they adopted many of its concepts to devise what is known as traditional grammar. Eight parts of speech, 12 verb tenses, and Latin-based concepts and terminology comprised this grammar.

Significant studies of oral language development in children during the Traditional Grammar Era were influenced greatly by the techniques of Dorothea McCarthy (1930). In a study initiated in 1930, McCarthy examined language function, length of sentences, complexity of sentence structure, proportion of various parts of speech, and vocabulary. A group of 140 children, approximately equally divided between sexes, was used. Their ages encompassed seven levels from 18 to 54 months. They were selected on the basis of parental occupation, each of six occupational classifications being represented in the final sample. Each child was interviewed individually in either his home or nursery school. With stimuli consisting of toys and picture books, 50 consecutive verbal responses were recorded by the investigator.

McCarthy examined the relationship between length of response and structural complexity and several variables--

chronological age, mental age, sex, and parental occupation. Verbal responses could be either complete sentences or clusters of words separated by pauses; therefore, a sentence fragment could count as a response. The length of a comprehensible response was determined by the number of words it contained; the length of a semicomprehensible response, by the number of syllables combined. To analyze vocabulary, word tokens and word types were examined. Word tokens are the total number of words spoken; word types are the total number of different words spoken.

McCarthy's findings included the following: (a) mean length of utterances increased with chronological age, (b) the number of both word tokens and word types increased with age, and (c) both of the above were affected by higher mental age and by parental occupation. As late as 1954, McCarthy reaffirmed her belief that the mean length of sentence has no equal as a "reliable, easily determined, objective, quantitative, easily understood measure of linguistic maturity" (1954, pp. 550-551).

Other researchers during the Traditional Grammar Era who were influenced by McCarthy's methodology and whose findings supported hers were Day in 1932, Davis in 1937, and Templin in 1957. All of the studies except one reported that girls generally manifest a higher level of development than boys. Templin (1957) found a significant difference between boys and girls.

Structural Grammar Era

The foundations of structural grammar lie in the work of Bloomfield in 1933, Block and Trager in 1942, and Fries in 1952. Emphasis was placed on four components of language:

1. Phonology--the sound system of a language.
2. Morphology--the meaning units in a language.
3. Syntax--the grammar system of a language.
4. Semantics--the system of meaning in a language.

In structural grammar, focus was not on a prescribed set of rules, but rather on form class words, structure words, and sentence patterns as ways of describing usage.

Landmark studies in this era include the work done by Strickland in 1962 and Loban in 1963. Both of them, having similar linguistic theories, designed studies similar to McCarthy's. Strickland used 575 children in grades one through six. Their ages ranged from six years to 14 years, 11 months. Loban's study was longitudinal, tracing the language development of children through the sixth grade. In these studies, a sentence was defined as "a unit of speech ending with a distinct falling intonation which signals a terminal point," a phonological unit. In both studies, oral language development was analyzed according to structure of syntactic patterns, length of sentences, frequency of specific syntactic patterns, and flow of language.

Strickland (1962) reported that there was more variation in the length of the phonological unit within groups than between groups, and that younger children used longer phonological units than older children. She also found that girls spoke in longer units than boys. From this study she concluded that sentence length was not an effective measure of language maturity, a conclusion supported by Loban. She also determined that children learn the basic structures of language at an early age, having found a wide range of syntactic structures being used by children at all age levels.

Loban used two classifications in addition to the phonological unit to help analyze oral language--the communication unit and the maze. A communication unit was defined as an independent clause with its modifiers; a maze was defined as words in a series, word parts, or fragments which were neither communication units nor necessary parts of communication units. Among Loban's conclusions were these: (a) number of word tokens, number of communication units, and mean number of words in communication units increased with chronological age; (b) the use of mazes decreased with chronological age. He determined that since communication units and mazes could be measured independently, they held promise as measures of language development. A final conclusion of Loban's was that flexibility within patterns is a discriminating

measure of language. This conclusion was confirmed by the work of Strang and Hocker (1965).

Transformational Grammar Era

Transformational generative grammar, called transformational grammar, has its origins in the work of Noam Chomsky. He expounded his theory in his book, Syntactic Structures, in 1957 and modified the concept slightly in Aspects of the Theory of Syntax in 1965. He described generative grammar as a "system of rules that in some explicit or well-defined way assigns structural descriptions to a sentence" (1965, p. 8). The underlying theory was that each individual is born with an ability to acquire his native language. Once exposed to the syntactical rules, he can generate an infinite number of sentences. Transformational grammarians examine how the various structures within a sentence relate to each other.

Chomsky (1965) has differentiated between language competence and language performance. Competence is the internal mastery of the rules of a language while performance includes the observable behaviors of speaking, reading, and writing. The measure of performance cannot yield the degree of competence. Fox (1970) stated that extraneous factors prevent an individual from performing at his competence level. An important aspect of both competence and performance is an understanding of syntactic rules.

Syntactic complexity. A significant contribution of the transformational grammarians was the identification of the "minimal terminal unit" (T-unit) by Kellogg W. Hunt (1965). This is a basic unit of expression consisting of a single main clause and the subordinate clause joined to it (Hunt, 1965, p. 20). It can be a simple or complex sentence; the compound sentence is considered to be two T-units (O'Donnell, Griffin, & Norris, 1967, p. 43). The T-unit is the equivalent of the communication unit identified by Loban. Prior to this time there had been no quantitative measures of the length of sentences and/or clauses which were considered valid, reliable indices of syntactic maturity (Belanger, 1978).

Hunt developed the T-unit through examination of the spontaneous written language of 54 school-age children, applying transformational grammar theory. Looking for significant increases from one grade to another, he surveyed four measures--sentence length, clause length, subordination ratio, and T-unit. Analysis indicated that the phonological unit was the least effective measure of language maturity. Since children often use coordinating conjunctions, they produce long, run-on type sentences. Length of clauses was not considered a good index because of the many overlaps in the eighth and twelfth grades. Overlap among individuals within groups was found when the subordination ratio was used. The fourth measure, mean length of T-unit, had minimal overlapping among age groups.

Hunt concluded that the T-unit was the most accurate index of syntactic maturity, followed by clause length, subordination ratio, and sentence length. Findings indicated that younger children expanded T-units by adding subordinate clauses while older children expanded the clauses; therefore, there was more increase in the length of clauses than the number of clauses.

The T-unit was found to be an accurate index of oral language development as well as written language development by O'Donnell, Griffin, and Norris (1967). Their population included 30 children from each grade, kindergarten through third, and the addition of fifth and seventh grades. The children were shown films of the two Aesop fables--"The Ant and the Dove" and "The North Wind and the Sun"--without sound. First the children were asked to tell the story they had seen; then they were asked a question relating to the story. Their responses comprised the language sample. Analysis showed a consistent increase in length of responses at all grade levels included in the study and significant increments in mean length of T-unit from grade to grade. They concluded that "mean length of T-unit has special claim to consideration as a simple, objective, valid indicator of development of syntactic control" (O'Donnell, Griffin, & Norris, 1967, pp. 98-99).

In a partial replication of the previously described study, Fox (1970) found a similar pattern, the mean length of T-units increasing at each grade level.

Eighty children in grades kindergarten through third comprised her sample. Like O'Donnell, Griffin, and Norris, she found significant progression between kindergarten and first grade.

Both of these studies were partially replicated by Ciani in 1974. He too found the length of T-unit to increase across grade levels, but his study showed the greatest increase to occur between grades two and three, not between kindergarten and first grade. A similar developmental trend was found in the mean total number of words spoken by children in each grade. His T-unit results not being similar to the comparison studies, he concluded that the differences could have their origins in either the different stimulus material used or the different population sampled (a rural population).

Both immediately after his own research and in a later article, O'Donnell (1976, 1977) commented on limitations of the use of the T-unit. In the 1976 article he stated that:

An obvious limitation of T-unit length lies in the fact that indices based on the mean length of syntactic units do not discriminate among the various ways length can be achieved. The T-unit is more satisfactory in this respect than the sentence, but the T-unit can be lengthened in a variety of ways, some of which require much more linguistic maturity than others. The desire to find a more discriminating index of language development has led researchers to attempt to develop more sensitive indices of structural growth. (p. 31)

Another measure of syntactic maturity was designed, the Syntactic Density Score (SDS) (Golub & Frederick, 1971). This procedure was originated by Golub during a 1971 study he conducted with Frederick. Using multivariate analysis, he isolated ten variables which correlated highly with teacher judgment of children's writing. After relative weights were assigned to each variable according to its contribution to syntactic density, the frequency of each variable was counted and weighed. The SDS was derived by totaling the resulting products and dividing by the number of T-units; thus, measures of T-unit length, clause length, number of subordinate clauses, embeddings, and verb expansions were all considered.

Kidder (1974), using the SDS, analyzed written language of 119 children in grades one through six. Mean scores increased at each grade and at each age level, especially at two-year intervals. These results were consistent with earlier research findings which showed children's abilities to use more complex structure developing with age (Hunt, 1965; O'Donnell, Griffin, & Norris, 1967).

While appearing to have a strong empirical base, the Syntactic Density Score is reported by researchers to have some inherent problems. O'Donnell compared mean length of T-unit and Syntactic Density Score in a 1976 study. The correlation between the two was examined by analyzing compositions written by 32 sixth graders according to both

measures. The high correlation ($r = .88$) suggested a high level of redundancy in what is measured. T-unit length was determined to be less expensive in calculation, thereby being a "more useful and usable index of syntactic development than the Syntactic Density Score" (O'Donnell, 1976, p. 9). O'Donnell suggested that the SDS be used only when a more detailed analysis was necessary. He further questioned the arbitrary manner in which loadings were assigned to items. For example, he could cite no linguistic reason for participles being assigned greater weight than prepositional phrases. He additionally challenged the validity of the conversion of the SDS to grade equivalency. A writing sample which was apparently at tenth grade level fell at grade four on the conversion table. O'Donnell stated that length of T-unit would be a better predictor of grade level.

Belanger (1978) reported what he viewed as a problem of greater magnitude than those enumerated by O'Donnell (1976), an anomaly in the mathematical scoring of the SDS. Variables one to four in the SDS are averaged scores while variables five to ten are raw scores. All the values of the variables are summed and divided by the number of T-units, creating a false variation in the quotient. This allows shorter language samples to yield higher SDS scores than longer ones. Belanger proposed a modification--dividing the weighted raw score values of variables one to four by the constant 10--to restore balance to the scale.

Another method of controlling for the irregularity created by widely varying sample size is to control the length of the language samples to be analyzed.

Despite some limitations, the Syntactic Density Score will disclose developmental differences in syntactical maturity if the sample is large enough (O'Donnell, 1976). A requisite language sample length has not been specified (Belanger, 1978).

In summary, the T-unit developed by Hunt (1965) has been shown to be a useful index of syntactic maturity. The Syntactic Density Score (Golub & Frederick, 1971) is an additional index of syntactic development. It has been shown to be highly correlated with the T-unit but is less economical. However, the SDS may be considered useful in research because it does demonstrate differences in syntactical development.

Vocabulary richness. Two studies in the 1970s utilized the number of different words used and the corrected type-token ratio to measure vocabulary richness. The corrected type-token ratio is calculated by dividing the number of word types by the square root of twice the number of word tokens (Carroll, 1964).

Fox (1970) found a consistent increase by grade levels in the mean number of word types spoken. This was consistent with the findings of McCarthy (1930) and Templin (1957) who used the same measure. Using the corrected

type-token ratio with higher grade levels, Fox found greater diversity in vocabulary.

In the Ciani study (1974), the use of the corrected type-token ratio showed no developmental trends. After looking at other indices, Ciani reported an increase in the mean number of different words across grade levels, an increase in the mean total number of words spoken between grades two and three, and a slight increase in the mean type-token ratio scores across the three grades.

Because Golub and Frederick had reasoned in 1971 that a more complete analysis of language complexity could be effected if the Syntactic Density Score were used in conjunction with a vocabulary measure, Kidder (1974) developed the Vocabulary Intensity Index (VII). Level of vocabulary difficulty, diversity of vocabulary, number of multisyllabic words, and word building application comprised the factors which made up the VII. Level of vocabulary was determined by comparing language samples to a list of the 500 words most often encountered in third-grade readers; vocabulary diversity was computed by the word type/word token ratio; multisyllabic words were counted; and word building was measured by the use of prefixes and suffixes. With the sample being first graders through sixth graders, the analysis of data reflected increases in vocabulary intensity in the early years, both plateaus and regressions in the middle years, and an upward curve in the higher

elementary grades. In looking at possible causes for these variances, Kidder considered the following: (a) during maturation vocabulary development may be influenced by other factors, (b) vocabulary may not develop as measurably as syntax, and/or (c) vocabulary development levels off after third grade. Syntax and vocabulary both seem to increase in early years whereas only syntax increases beyond third grade.

While the descriptive studies of the syntactic and vocabulary aspects of language development previously have been described, other methods of examining language were being utilized also. Some controversy has existed concerning different methods in language research.

Methods in Language Research

Studies conducted by McCarthy (1930), Templin (1957), Strickland (1962), Hunt (1965), Loban (1963), and O'Donnell, Griffin, and Norris (1967) were highly criticized by Roger McCaig in 1970. He specifically found fault with their method of collecting natural language samples and analyzing them afterwards to contrast differences among groups. He preferred the method of having an advanced list of items to inventory, as carried out by Berko (1958), Brown and Bellugi (1964), and Menyuk (1963). He described the work of the latter group as "intensive work with a small population," perhaps implying that the work of the former group was not intensive.

In response, Hunt (1970) pointed out differences between studies of language acquisition and studies of language development. He described the studies of Berko, Brown and Bellugi, and Menyuk as hypothesis-testing type research designed to analyze specific grammatical structures. These studies were oriented toward language acquisition and tested predetermined hypotheses. In contrast, his own work and that of McCarthy, Templin, Strickland, Loban, and O'Donnell, Griffin, and Norris, were designed to analyze spontaneous oral language. This type of research, oriented toward language development, provided descriptive information and provided a basis for future hypothesizing. Its major value is in providing a baseline to which deviations from normal language development can be compared.

The Learning Disabled and Language Development

During the last fifteen years, considerable research has been conducted on the language development of the learning disabled. It has been only in recent years that transformational grammar analysis has been applied. Most previous studies used sentence repetition tasks to measure syntactic abilities and used samples with limited age ranges (Andolina, 1978).

Fry (1967) and Schulte (1967) studied oral language in 36 dyslexic children and 21 normal readers in the second grade. Twenty pictures were used as stimuli and the subjects were asked to tell a story about each. After

recordings were transcribed, 50 independent clauses were selected to be analyzed by two different methods. A traditional method examining proportion of total words, total different words, type-token ratios, and types and frequencies of different syntactic patterns was employed. Chomsky's transformational grammar model was used. The following major findings resulted: (a) the language of good readers was characterized by greater fluency and larger vocabularies; (b) the linguistic development of the good readers was more advanced; (c) poor readers described obvious characteristics of the stimulus while good readers were more creative and detailed. Fry and Schulte concluded that a possible relationship could be found between language disabilities and reading disabilities.

In 1975, Semel and Wiig examined syntactic structures and critical verbal elements of learning-disabled children. Their performances were compared with those of a control group of academically achieving children and with existing norms. Instruments used were the Northwestern Syntax Screening Text (NSST) (Lee, 1969) and the Assessment of Children's Language Comprehension (ACLC) (Forster, Giddan, & Stark, 1972). On the NSST receptive subtest, learning-disabled children scored significantly lower than the control group. However, more alarming was the fact that 76% of them scored below the 10th percentile. The learning-disabled children, whose ages ranged from 7 years, 1 month

to 11 years, 6 months performed as 6- to 6 1/2-year olds on the ACLC, according to normative data.

In 1974, Vogel studied both syntax and morphology as used by learning-disabled and normal children. The age range within the sample was 7 years, 4 months to 8 years 5 months. Using two standardized and seven experimental measures, she evaluated five aspects of syntactic functioning in oral language: recognition of melody pattern, recognition of grammaticality, comprehension of syntax, sentence repetition, and syntax and morphology in expressive language. The Lee and Canter Developmental Sentence Scoring Procedure (DSS) (1971) was used to measure syntax in expressive language. This procedure estimates the degree to which a child has generalized the grammatical rules of his language. The findings confirmed that learning-disabled children are deficient in oral syntax.

Because of research which indicated that children with learning disabilities manifest a variety of productive language deficiencies, Wiig and Semel (1975) identified a battery of tests to measure semantic production abilities. Their study focused on accuracy and speed of semantic production, sentence formulation, and word definition abilities. The performances of learning-disabled and academically achieving adolescents were compared. The learning-disabled subjects were slower and less accurate in naming verbal opposites and pictorial presentations; they named significantly fewer items in the food category;

they produced shorter sentences and a greater number of agrammatical sentences; and they gave more incorrect word definitions than the control group.

In a 1977 study designed to explore the relationships between processing and production abilities of learning-disabled adolescents, Wiig, Lapointe, and Semel identified deficits in two different language syndromes. First, they found reductions in morphology and syntax in comprehension, and, secondly, they found dysnomia, characterized by word-finding and retrieval deficits.

A study by Andolina (1978) examined syntactic maturity and vocabulary richness in the oral language of learning disabled children over a wide age range. The sample consisted of 80 children at four different age levels from 7.5 to 13.5 years. As in the O'Donnell, Griffin, and Norris study (1967), two films depicting Aesop's fables were shown without sound to provide the stimulus for the language sample. The children's responses were recorded and transcribed. To measure syntactic maturity, the T-unit and syntactic density formula were used; to measure vocabulary richness, the corrected type-token ratio and the Vocabulary Intensity Index were used. Findings were as follows (Andolina, 1978, pp. 87-88):

1. A significant, positive linear trend, indicating a developmental pattern, was found in mean number of T-units and total number of words spoken--both measures of syntactic maturity.

2. A significant, positive linear trend, indicating a developmental pattern, was found in vocabulary richness measured by corrected type-token ratio and as measured by the number of different words spoken.
3. No observable developmental pattern was found in syntactic maturity as measured by the Syntactic Density Score, nor in vocabulary development as measured by the Vocabulary Intensity Index and simple type-token ratios.
4. When compared to the development of normal children as described in previous research, the development of language in learning disabled children showed more gradual rates of growth in both vocabulary and syntax.

Andolina compared her findings with learning disabled children to the findings of O'Donnell, Griffin, and Norris (1967), Fox (1970), and Ciani (1974). Comparisons of syntactic maturity, as measured by length of T-unit, and vocabulary richness, as measured by the corrected type token, were made. The comparison of mean length of T-unit showed trends found by Andolina to be generally parallel to those found by O'Donnell, Griffin, and Norris (1967) and Fox (1970). The means at each age level were slightly lower in the Andolina results.

Using the corrected type-token ratio for comparison, Andolina's findings were similar to those of Fox (1970). Both found means increased significantly across the first three age levels. Andolina's results, however, showed a slight decrease in the fourth age group (ages 12.1 to 13.5). This could possibly indicate the beginning of a

leveling trend in the vocabulary development of learning-disabled children of adolescent age.

Several factors must be considered in reviewing the results of Andolina's research. Subjects ranged in age from 7.5 years to 13.5 years, but the language stimulus, a film shown without sound depicting an Aesop fable, was the same for all age ranges. Perhaps the slight decline for the oldest age group was a function of the stimulus employed to elicit oral language. In addition, the results from Andolina's study were compared with three other studies of normal subjects from widely differing geographical areas, and the studies which were compared spanned a time period of more than 10 years. Additional research is needed which (a) compares the language development of learning-disabled and normal students from the same geographical area; (b) extends the chronological age range of subjects into the secondary school; and (c) employs stimulus materials more appropriate for intermediate and secondary age students. Similar recommendations for research were proposed by Andolina (1978, pp. 96-99).

Summary

Research in the United States concerned with oral language development in children began in the early 1900s. Since the subjects were usually the investigators' own children, the results were not generally applicable (Andolina, 1978). Controlled studies, utilizing representative sampling and systematic data gathering,

began in the 1920s. Since that time, research concerning normal language development has generally been divided into three theoretical eras: (a) the Traditional Grammar Era, (b) the Structural Grammar Era, and (c) the Transformational Grammar Era (Ciani, 1974; Fox, 1970; O'Donnell, Griffin, & Norris, 1967).

The Traditional Grammar Era was influenced by eighteenth-century grammarians and focused on Latin-based concepts and terminology. Studies of oral language development during this era reflected the procedures of Dorothea McCarthy. In a study initiated in 1930, she examined language function, length of sentences, complexity of sentence structure, proportion of various parts of speech, and vocabulary. Her findings included the following: (a) mean length of utterances increased with chronological age, (b) the number of both word tokens and word types increased with age, and (c) both of the above were affected by higher mental age and parental occupation. Her findings were generally supported by Day (1932), Davis (1937), and Templin (1957).

In the Structural Grammar Era, emphasis was placed on four components of language--phonology, morphology, syntax, and semantics. Landmark studies done in this era include the work done by Strickland (1962), who used children in grades one through six, and Loban (1963), who conducted a longitudinal study tracing the language development of children through the sixth grade. Strickland concluded that

younger children used longer phonological units than older ones and that sentence length was not an effective measure of language maturity. This conclusion was supported by Loban, who additionally found that number of word tokens, number of communication units, and mean number of words in communication units increased with chronological age.

The Transformational Grammar Era had its origins in the work of Noam Chomsky (1957, 1965). The underlying theory was that each individual is born with an ability to acquire his native language. Competence--the internal mastery of the rules of language, and performance--the observable behaviors of speaking, reading, and writing--were important aspects of Chomsky's theory.

An important component of both competence and performance is syntactic maturity. The T-unit was developed by Hunt (1965) as an index of syntactic maturity. Golub and Frederick (1971) devised the Syntactic Density Score (SDS) as another index. While highly correlated with the T-unit, the SDS is more expensive. O'Donnell (1976) suggested that the SDS be used when a more extensive analysis of syntactic development was necessary.

In response to Golub and Frederick (1971), who reasoned that a more complete analysis of language complexity could be effected if the SDS were used in conjunction with a measure of vocabulary, Kidder (1974) developed the Vocabulary Intensity Index (VII). This was comprised of the level of vocabulary difficulty, diversity of vocabulary,

number of multisyllable words, and word-building application.

While measures of syntax and vocabulary were being devised, other strategies of language research were being utilized, leading to controversy concerning techniques used in language research. This controversy focused on the differences in procedures used in the studies of language acquisition and those used in studies of language development. Hunt (1970) proposed that research oriented toward language development provides a basis for future hypothesizing. It provides a baseline to which deviation from normal language development can be compared.

It has been only in recent years that transformational grammar analysis has been applied to research on the language development of the learning disabled. Fry (1967), Schulte (1967), Vogel (1974), Semel and Wiig (1975), and Wiig, LaPointe, & Semel (1977) are among researchers who found the language development of learning-disabled children to be deficient. Among deficits found were poor vocabulary skills, inadequate receptive language skills, syntactical deficiency, poor comprehension of morphology and syntax, and dysnomia.

Andolina (1978) examined syntactic maturity and vocabulary richness in the spontaneous oral language of learning-disabled children. She compared her findings to those of O'Donnell, Griffin, and Norris (1967), Fox (1970), and Ciani (1974) whose research involved normal children.

The learning-disabled children showed more gradual rates of growth in both syntax and vocabulary, and the result from the highest age group indicated a possible leveling trend in vocabulary. Andolina recommended additional research to compare the language of learning-disabled and normal children from the same population, to extend the chronological age range of subjects into the secondary school, and to employ more appropriate stimulus materials.

METHODS AND PROCEDURES

The purpose of this study was to compare learning-disabled and normal children on two aspects of language development. The method employed replicated, in part, procedures in other studies on language development of normal children (O'Donnell, Griffin, & Norris, 1967; Fox, 1970; Ciani, 1974) and learning-disabled children (Andolina, 1978). Appendix A presents a summary comparing the methods of the present study and the four previous studies. The following sections present additional detail.

Subjects

All subjects involved in the study were enrolled in the public schools in Tuscaloosa County, Alabama. This are includes the communities of Northport and Holt and the rural areas surrounding the city of Tuscaloosa. Approximately 13,000 students in kindergarten through grade 12 are enrolled in 14 elementary schools, four junior high schools, and four high schools. Programs for children with specific learning disabilities are operated in 11 elementary schools, four junior high schools, and one senior high.

Approximately 300 students are identified and served in these programs.

Subjects were identified for both the learning-disabled and normal groups at four age levels: 9 years, 0 month to 10 years, 6 months; 10 years, 7 months to 12 years, 0 months; 12 years, 1 month to 13 years, 6 months; 13 years, 7 months to 15 years, 0 months. Eighteen white male learning-disabled subjects and eighteen white male normal subjects matched for chronological age within 60 days, for Intelligence Quotient (IQ) within ten points, as well as for school and grade placement were identified for each age level, comprising a total sample of 72 learning-disabled and 72 normal children. This age range was selected based on previous research which found that normal children master syntactic structures by the age of seven even though development continues after this age (Chomsky, 1965; Hunt, 1970; Strickland, 1962) and based also on the recommendation by Andolina (1978) to extend the age range into secondary school. The use of white male subjects was employed for several reasons. First, the previous four studies (see Appendix A) employed white subjects, and secondly, Blacks are not represented proportionally in middle and higher socioeconomic statuses in Tuscaloosa County. Previous research has reported a positive relationship between language and socioeconomic status (Loban, 1963; McCarthy, 1964; McGrady, 1968; Templin, 1957) with children from middle and higher socioeconomic status families showing

more advanced language development than children from low socioeconomic families.

Bernstein (1961) cited Sampson who proposed that social environment contributes to speech development. The important linguistic differences include differences in the verbalizations and vocabulary. Bernstein continued by saying that the language of the lower working class is characterized by rigid syntax and restricted use of structural possibilities for sentence organization.

While research about the difference in language development of girls and boys is mixed with some studies favoring girls (Davis, 1937; McCarthy, 1930) and others showing no differences (Fox, 1970; Strickland, 1962), the present study was limited to males. The disproportionate number of boys identified as learning disabled (e.g., four to one by Wheatley, 1977) was the primary basis for limiting the sample to males.

Criteria for identification as learning disabled followed guidelines established by the Alabama Department of Education. These are:

1. An IQ of 80 or above on the Wechsler Intelligence Scale for Children, or the Stanford-Binet Intelligence Test.
2. Not been judged severely emotionally disturbed and free from primary motor or sensory impairments.
3. Exhibit a severe discrepancy in achievement which falls below 60% of expectancy in any of seven areas

which include oral language, written language, basic reading, reading comprehension, mathematical calculation, mathematical reasoning, and listening comprehension.

4. A severe discrepancy between expectancy and achievement was determined as follows: (a) Expectancy Level was calculated by the formula: Expectancy Level = Chronological Age x IQ, divided by 100, minus 5,

$$EL = \frac{CA \times IQ}{100} - 5$$

(b) Discrepancy was calculated in the following manner: Achievement Level was determined by grade placement earned on achievement tests. The Expectancy Level was multiplied by 60%; if the resulting score was higher than the actual Achievement Level, a severe discrepancy existed.

The principal investigator verified that appropriate criteria were employed and that only those children who met the criteria when they were placed in the learning-disabilities program were considered for the study.

White, male learning-disabled children were categorized by age levels appropriate for this study. Children being provided with speech therapy services and children who had been referred for such services were eliminated. Following the identification of learning-disabled children, school grade level and chronological age for each learning-disabled subject were identified. After this, the names of all nonlearning-disabled boys who were enrolled in the same school, same grade level, and

whose chronological age was within 60 days were listed. From this list, the names of boys who currently were enrolled in special education were removed, as well as the names of boys being provided with speech therapy services and those who had been referred for such services. Boys whose names still appeared on the list were administered the Slosson Intelligence Test (1971) until a boy was identified whose IQ was within 10 points of the IQ of the learning-disabled subject. This procedure was followed in matching each learning-disabled subject and yielded a total of 18 learning-disabled and 18 normal subjects at each of the four age levels.

No attempt was made to match for socioeconomic status. The constraints of matching birthdate within 60 days, IQ within 10 points, and school and grade placement within a white male population severely limited the number of available subjects. The selection of subjects from the same school population and IQ range may have helped to control for socioeconomic differences.

Table 1 provides the means and standard deviations by cells for intelligence quotient. Table 2 provides the means and standard deviations by cells for chronological age in months.

Data Collection

Two films were used to elicit oral language samples. "A Boy's Journey Through a Day" is a film without narration from the Coronet Company, and "Corral" is also a film without narration which is from the International Film Bureau. The

Table 1
Means and Standard Deviations for
Intelligence Quotient

<u>Age levels</u>	<u>Learning disabled</u>			<u>Normal</u>		
	<u>N</u>	<u>M</u>	<u>SD</u>	<u>N</u>	<u>M</u>	<u>SD</u>
9.0-10.5	18	94.94	8.07	18	97.10	7.83
10.6-12.0	18	93.22	6.35	18	93.83	7.83
12.1-13.5	18	96.94	8.48	18	97.22	9.25
13.6-15.0	18	94.33	6.96	18	95.61	7.12

Table 2
Means and Standard Deviations for Chronological
Age in Months

<u>Age levels</u>	<u>Learning Disabled</u>			<u>Normal</u>		
	<u>N</u>	<u>M</u>	<u>SD</u>	<u>N</u>	<u>M</u>	<u>SD</u>
9.0-10.5	18	116.89	5.13	18	116.39	5.49
10.6-12.0	18	134.83	7.95	18	135.06	8.03
12.1-13.5	18	150.94	3.66	18	150.56	4.10
13.6-15.0	18	169.00	5.73	18	169.00	5.48

two films were not used in previous studies, but a recommendation by Andolina (1978) suggested the use of different stimulus materials.

Interviewers were trained by the principal investigator prior to the initiation of data collection (see Appendix D). Standardized instructions were employed in both introductory remarks prior to showing the film as well as in collecting the oral language sample. These standardized procedures are delineated in Appendix C.

Four subjects, two learning-disabled and two normal, were shown films at one time. Care was taken to ensure that interviewers were not aware of the status of the subjects, and assignment of interviewers to subjects was made on a random basis. When subjects arrived at the film room, a standard introduction to the films was employed. Following this, the first film, "Corral" was shown, after which interviewers and subjects went to four different areas for the oral language samples. Two questions were asked, the first requiring the subject to retell the story and the second requiring him to relate an aspect of the film to his own life. After completion of the samples, subjects and interviewers returned to the film room to see the second film, "A Boy's Journey Through a Day." The procedures for collecting the oral language samples were repeated, and the subjects were returned to their classrooms.

Preparation of Language Samples for Analysis

Each interviewer transcribed the tape recordings which she had made. The transcriptions were limited to

approximately 250-275 words. Kidder (1974) stated that the Syntactic Density Scores and Vocabulary Intensity Index yielded scores which were highly correlated when sample sizes were limited to 200, 500, and 1000 words. Limiting the language sample lengths to approximately the same number of words diminished the changes of data being affected by the mathematical anomaly in the Syntactic Density Score described by Belanger (1978) and the varying effects of length on the simple type-token ratio described by Carroll (1964).

After each interviewer transcribed her tape recordings, the transcriptions were typed according to rules in Appendix E. The principal investigator checked all transcripts against tape recordings and made corrections. A second check was made to ensure correct punctuation. The final typed transcripts were key-punched on data cards and fed into the computer. The oral language samples were analyzed for syntactic development and vocabulary development utilizing the Syntactic Density computer program (Golub & Kidder, 1974) and the Vocabulary Intensity Index (Kidder, 1974). Facilities at Pennsylvania State University were employed in this step of data analysis.

Indices of Syntax and Vocabulary

Two aspects of language development, syntactic development, and vocabulary development were used for this study. The measures of syntactic development included the number of T-units, the average number of words per T-unit, and the Syntactic Density Score. The measures of vocabulary development included the corrected type-token ratio,

the Vocabulary Intensity Index, the number of different words spoken, and the simple type-token ratio.

Syntactic development. The Syntactic Density program yields a Syntactic Density Score (SDS) which is a function of ten variables highly correlated with teacher judgments of high quality written language, including words per T-unit, subordinate clauses per T-unit, and similar measures. Each variable is weighted according to the amount of influence each carries. Appendix F shows a tabulation sheet for the Syntactic Density Score. A grade level conversion table is provided on the tabulation sheet. The number of T-units, average T-unit length, and total number of words are also included in the tabulation sheet, thus providing data for all the indices of syntactic development.

Vocabulary development. The Vocabulary Intensity Index program (Kidder, 1974) yields a Vocabulary Intensity Index score which is a function of several variables associated with vocabulary richness as confirmed by Kidder (1974). These variables and the tabulation sheet for the Vocabulary Intensity Index score are shown in Appendix G. A computer printout provides information about all vocabulary development variables except the corrected type-token ratio. This ratio was devised by Carroll (1964) to compensate for the high type-token ratio found in short language samples. It consists of the number of word types used by the subject divided by the square root of twice the

number of word tokens. Although the Vocabulary Intensity Index, as it was designed, did not provide for a calculation of the corrected type-token ratio, the computer program was modified to do so for the purpose of this study.

Research Design

A two-way analysis of variance design was utilized in this study, with age as one factor and group membership as the other. The age factor comprised four levels: 9.0-10.5, 10.6-12.0, 12.1-13.5, and 13.6-15. Group membership consisted of learning-disabled subjects and normal subjects. Data for the present study were analyzed at The University of Alabama employing an analysis of variance program from the Behavioral Sciences Statistics Program Library (Barker & Barker, 1977).

RESULTS

Purpose of the Study

The purpose of this study was to compare the language development of learning-disabled and normal students at two intermediate- and two secondary-age levels. Aspects of language development identified for this study were syntactic development and vocabulary development. The following sections report the results of this study and provide comparisons with results from previous studies.

Hypothesis I

Hypothesis I predicted that there would be significant differences between learning-disabled and normal children of two intermediate- and two secondary-age levels in syntactic development as measured by the number of T-units, the mean length of T-unit, and the Syntactic Density Score. Two-way analysis of variance was employed in testing Hypothesis I for each of the three variables. Trend analysis was used to determine if linear, quadratic, or cubic trends were present where significant differences were noted among age levels.

Results revealed no interaction effects for any of the three variables. Main effects for groups were found for number of T-units, and main effects for both age level and groups were found for the Syntactic Density Score. Trend analysis revealed a significant linear trend across age levels for the Syntactic Density Score.

Number of T-units. Analysis of variance conducted on raw scores for number of T-units indicated significant main effects for groups (see Table 3). Means for column effects (see Table 4) showed that learning-disabled students produced, on the average, 2.77 more T-units than did their normal peers. Examination of the cell means in Table 4 indicated that learning-disabled students produced more T-units than normal students at each of the four age levels. Thus, support for Hypothesis I was evident.

Results from the present study were not compared with results from Andolina's study because this variable is affected by total length of language sample which was controlled in the present study.

Mean length of T-unit. Analysis of variance conducted on mean length of T-unit disclosed no main effects for either groups or age levels (see Table 5). Although significance was not achieved, it should be noted that inspection of the cell means indicated that, at each age level, normal children produced longer T-units than learning-disabled children (see Table 6). The nonsignificant differences between the two groups were slight at age levels

Table 3
Analysis of Variance for Number of T-units

Source	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>p</u>
Age	125.11	3	41.70	.61	.61
Groups	277.78	1	277.78	4.06	.04*
Age x Groups	113.56	3	37.85	.55	.65
Within cell	9,313.56	136	68.48		
Total	9,830.00	143			

* $p < .05$

Table 4
Means for Cells, Groups, and Age Levels for
Number of T-units

Age levels	L.D.	Normal	Age level means
1	38.44	33.33	35.89
2	38.61	37.61	38.11
3	36.61	35.50	36.06
4	37.89	34.00	35.94
Group means	37.89	35.11	

Table 5
Analysis of Variance for Mean Length
of T-unit

Source	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>p</u>
Age	6.99	3	2.33	1.22	.30
Groups	3.58	1	3.58	1.87	.17
Age x Groups	2.18	3	.73	.38	.76
Within Cell	259.30	136	1.71		
Total.	272.05	143			

Table 6
Means for Cells, Groups, and Age Levels for
Mean Length of T-unit

Age levels	L.D.	Normal	Age level means
1	7.44	7.60	7.52
2	7.41	7.44	7.43
3	7.70	8.10	7.90
4	7.58	8.25	7.91
Group means	7.54		

one (.16) and two (.03), but greater at age levels three (.40) and four (.67). Thus, Hypothesis I was not supported for the variable of mean length of T-unit.

A comparison of the mean scores of learning-disabled subjects from the present study with Andolina's (1978) learning-disabled subjects disclosed some differences. Andolina's findings showed a slight increase in mean length of T-unit at each age level, while findings from the present study revealed a slight regression between age levels one and two followed by an increase at age level three and a regression at age level four (see Table 7).

A comparison of normal subjects from the present study with normal subjects from previous studies in Table 8 disclosed some differences. The study by O'Donnell, Griffin, and Norris (1967) and the study by Fox (1970) showed increases in mean length of T-unit with increases in age. The Ciani (1974) study and the present study showed slight regression from the first age group to the second; however, Ciani's subjects in groups one and two were younger than groups one and two of the present study.

Syntactic Density Score. Analysis of variance conducted on Syntactic Density Scores indicated significant effects for both groups and age levels (see Table 9). Differences were noted consistently between groups and across all four age levels. Means for group effects (see Table 10) showed that normal children achieved Syntactic Density Scores that were .18

Table 7

A Comparison of Mean Length of T-unit for Learning-Disabled Subjects in Two Studies

Age levels	<u>Andolina</u>		<u>Present study</u>	
	<u>N</u>	Mean	<u>N</u>	Mean
7.5- 9.0 years	20	7.40		
9.1-10.5 years	20	7.61	18	7.44
10.6-12.0 years	20	7.91	18	7.41
12.1-13.5 years	20	8.02	18	7.70
13.6-15.0 years			18	7.58

Table 8

A Comparison of Mean Length of T-unit for Normal Subjects in Four Studies

Study	Mean		Mean		Mean		Mean		Mean		Mean	
	Mean	T- age unit	Mean	T- age unit	Mean	T- age unit	Mean	T- age unit	Mean	T- age unit	Mean	T- age unit
O'Donnell, Griffin, and Norris (1967)	7.11	7.97	8.9	8.33	10.10	8.73			13.0	9.80		
Fox (1970)	7.3	7.66	8.4	7.80	9.3	8.16						
Ciani (1974)	7.0	5.90	8.4	7.80	9.1	6.53						
Present study (1979)					9.8	7.60	11.3	7.44	12.7	8.10	14.1	8.25

Table 9
Analysis of Variance for Syntactic Density Score

Source	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>p</u>
Age	2.01	3	.67	3.174	.026*
Groups	1.17	1	1.17	5.57	.019*
Age x Groups	.44	3	.15	.70	.558
Within cell	28.64	136	.21		
Total	32.26	143			

*p < .05

Table 10
Means for Cells, Groups, and Age Levels for
Syntactic Density Score

Age levels	L.D.	Normal	Age level means
1	1.62	1.73	1.68
2	1.76	1.84	1.80
3	1.84	2.02	1.93
4	1.80	2.16	1.98
Group means	1.76	1.94	

higher than the scores achieved by learning-disabled children. According to the grade level conversion table for the Syntactic Density Score, this difference would be the equivalent of 3.6 months or slightly over one-third of a grade level. An examination of cell means in Table 10 revealed that differences between the two groups were not as great at age levels one (.10) and two (.07) as they were at age levels three (.18) and four (.36). This pattern was consistent with the pattern of differences found in mean length of T-unit. Thus, support for Hypothesis I was again observed.

Results for Syntactic Density Scores showed significant main effects for age (see Table 9) with increases across the four age levels (see Table 10). Examination of cell means showed an increase in Syntactic Density Score from age level one to age level three with a slight decline at age level four for the learning-disabled group. The normal group increased consistently from youngest to oldest age levels.

As noted in Table 11, trend analysis across the four age groups showed a significant linear trend in the data. As age level means in Table 10 show, the gains are somewhat consistent with slight leveling at the oldest age level.

A comparison of the mean scores of the learning-disabled subjects in the present study with Andolina's subjects as shown in Table 12 disclosed some similarity.

Table 11
Trend Analysis for Syntactic Density Score
Across Four Age Levels

Source	MS	<u>MS</u>	<u>F</u>
Age	3	.67	3.17*
Linear	1	1.89	8.95*
Quadratic	1	.04	.21
Cubic	1	.01	.07
Within	136	.21	

*p < .05

Table 12
A Comparison of Syntactic Density Score for
Learning-Disabled Subjects in Two Studies

Age levels	<u>Andolina</u>		<u>Present study</u>	
	<u>N</u>	Mean	<u>N</u>	Mean
7.5- 9.0 years	20	1.71	--	--
9.1-10.5 years	20	1.71	18	1.62
10.6-12.0 years	20	1.77	18	1.76
12.1-13.5 years	20	1.76	18	1.84
13.6-15.0 years	--	--	18	1.80

Results from both studies showed a regression from the third age level to the fourth; however, Andolina's third and fourth groups were younger than the third and fourth groups from the present study.

Hypothesis II

Hypothesis II predicted that there would be significant differences between learning-disabled and normal children at two intermediate and two secondary age levels in vocabulary richness as measured by the number of word types, the simple type-token ratio, the corrected type-token ratio, and the Vocabulary Intensity Index. As with Hypothesis I, two-way analysis of variance was employed in testing Hypothesis II for each of the four variables. Trend analysis was used to determine if linear, quadratic, or cubic trends were present where significant differences were noted among age levels.

Results revealed no interaction effects for any of the four variables. Main effects were noted for age levels on the variables of simple type-token ratio and corrected type-token ratio. No main effects were noted for groups for any of the variables. Trend analysis revealed a significant quadratic trend across age levels for the corrected type-token ratio.

Number of word types. Analysis of variance conducted on raw scores for number of word types indicated that there were no main effects for either groups or age levels (see Table 13). Thus, support for Hypothesis II

Table 13
Analysis of Variance for Number of Word Types

Source	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>p</u>
Age	1,534.76	3	511.59	2.32	.077
Groups	427.15	1	427.15	1.9	.163
Age x Groups	261.56	3	87.19	.39	.760
Within cell	29,998.12	136	220.57		
Total	32,221.59	143			

was not found. Although the criterion for significance was not met, it should be noted that there was a considerable decline (5.2 word types) from the youngest age level to the second age level, followed by increases at levels three and four (see Table 14).

Results from the present study were not compared with results from Andolina's study because this variable is affected by total length of language sample which was limited in the present study.

Simple type-token ratio. Results for the simple type-token ratio indicated significant main effects only for age levels (see Table 15); thus, Hypothesis II was not supported. Examination of age level means in Table 16 revealed that the highest ratio (.40) was achieved by the youngest age level. Age level two reflected a considerable regression (.03) followed by a negligible increase at age level three and a considerable increase (.03) at age level four. Cell means indicated that both groups displayed similar patterns; however, the regression from level one to two was much greater in the normal group (see Table 16).

As noted in Table 17, trend analysis across the four age groups showed no significant trends for simple type-token ratio.

A comparison of the simple type-token ratio scores of learning-disabled subjects in the present study with scores of Andolina's subjects supplied some differences (see Table 18). Results from the present study indicated

Table 14

Means for Cells, Groups, and Age Levels for
Number of Word Types

Age levels	L.D.	Normal	Age level means
1	109.00	102.94	105.97
2	100.33	101.11	100.72
3	105.33	102.33	103.83
4	112.44	106.94	109.69
Group means	106.78	103.33	

Table 15

Analysis of Variance for Simple Type-Token Ratio

Source	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>P</u>
Age	.02	3	.01	2.63	.05*
Groups	.00	1	.00	.07	.79
Age x Groups	.01	3	.00	1.16	.32
Within cell	.35	136	.00		
Total	.38	143			

* $p \leq .05$

Table 16

Means for Cells, Groups, and Age Levels for
Simple Type-Token Ratio

Age levels	L.D.	Normal	Age level means
1	.39	.41	.40
2	.38	.37	.37
3	.39	.37	.38
4	.40	.40	.40
Group means	.39	.39	

Table 17

Trend Analysis for Simple Type-Token Ratio
Across Four Age Levels

Source	<u>df</u>	<u>MS</u>	<u>F</u>
Age	3	.01	2.63
Linear	1	.00	.00
Quadratic	1	.00	.08
Cubic	1	.00	.00
Within	136	.00	

Table 18

A Comparison of Simple Type-Token Ratio for Learning-Disabled Subjects in Two Studies

Age levels	<u>Andolina</u>		<u>Present study</u>	
	<u>N</u>	Mean	<u>N</u>	Mean
7.5- 9.0 years	20	0.40	--	--
9.1-10.5 years	20	0.38	18	.39
10.6-12.0 years	20	0.36	18	.38
12.1-13.5 years	20	0.35	18	.39
13.6-15.0 years	--	--	18	.40

a slight regression from age level one to age level two, followed by slight increases at subsequent age levels. Andolina's results disclosed a continuous regression from the youngest group to the oldest. Andolina stated that this trend reflected the increased length of language samples with increasing ages; longer language samples are purported to yield decreased type-token ratios. At the three age levels common to both groups, scores from the present study were higher than scores from Andolina's study.

Corrected type-token ratio. Results for the corrected type-token ratio indicated no significant effects for groups, thereby not providing support for Hypothesis II. Results indicated significant ($p < .01$) main effects for age levels (see Table 19). A pattern consistent with that found in the simple type-token ratio was found: There was a decrease in scores from age levels one to two, a moderate increase from two to three, and a greater increase from three to four (see Table 20).

Trend analysis was conducted across the four age levels on the corrected type-token ratio. As Table 21 indicates, a significant quadratic trend was observed. These results differ from a previous study employing the corrected type-token ratio.

A comparison of the corrected type-token ratio scores for the learning-disabled subjects of the present study and the learning-disabled subjects in Andolina's study uncovered some differences (see Table 22). Results

Table 19

Analysis of Variance for Corrected Type-Token Ratio

Source	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>p</u>
Age	2.61	3	.87	4.12	.008*
Groups	.20	1	.20	.95	.667
Age x Groups	.40	3	.13	.63	.603
Within cells	28.79	136	.21		
Total	32.00	143			

* $p < .01$

Table 20

Means for Cells, Groups, and Age Levels for
Corrected Type-Token Ratio

Age levels	L.D.	Normal	Age level means
1	4.62	4.61	4.61
2	4.30	4.36	4.33
3	4.52	4.32	4.42
4	4.73	4.58	4.65
Group means	4.54	4.46	

Table 21

Trend Analysis for Corrected Type-Token Ratio
Across Four Age Levels

Source	<u>df</u>	<u>MS</u>	<u>F</u>
Age	3	.87	4.12*
Linear	1	.10	.49
Quadratic	1	2.45	11.49*
Cubic	1	.09	.41
Within	136	.21	

* $p < .01$

Table 22

A Comparison of Corrected Type-Token Ratio for
Learning-Disabled Subjects in Two Studies

Age levels	<u>Andolina</u>		<u>Present study</u>	
	<u>N</u>	Mean	<u>N</u>	Mean
7.5- 9.0 years	20	4.45	--	--
9.1-10.5 years	20	4.69	18	4.62
10.6-12.0 years	20	5.15	18	4.30
12.1-13.5 years	20	5.10	18	4.52
13.6-15.0 years	--	--	18	4.73

from the present study revealed a regression between the first and second age levels, then increases at subsequent age levels. Andolina's results showed an increase through three age levels and a regression at the fourth. Andolina's fourth age level is equivalent to the third age level of the present study, where an increase was evidenced.

Vocabulary Intensity Index. Analysis of variance conducted on Vocabulary Intensity Index scores indicated that there were no main effects for either groups or age levels (see Table 23). Again, Hypothesis II was not supported. Although significance was not found, it should be noted that the pattern found in the other three measures of vocabulary development--namely, a decrease between age levels one and two followed by increases at subsequent age levels--was found (see Table 24). Examination of cell means indicated a plateau for learning-disabled subjects at the fourth age level.

A comparison in Table 25 of the Vocabulary Intensity Index scores of learning-disabled subjects in the present study with scores of Andolina's subjects disclosed some differences (Andolina, 1978). Results from the present study showed a regression from the first to the second groups followed by an increase and plateau. Andolina's findings exhibited a decrease in scores with increasing age. Furthermore, on the three age levels common to both studies, scores from the present study were substantially higher than scores from Andolina's study.

Table 23

Analysis of Variance for Vocabulary Intensity Index

Source	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>p</u>
Age	.04	3	.01	1.24	.299
Groups	.00	1	.00	.11	.740
Age x Groups	.03	3	.01	1.07	.364
Within cell	1.31	136	.01		
Total	1.37	143			

Table 24

Means for Cells, Groups, and Age Levels for Vocabulary Intensity Index

Age levels	L.D.	Normal	Age level means
1	.86	.88	.87
2	.84	.87	.86
3	.89	.84	.86
4	.89	.91	.90
Group means	.87	.88	

Table 25

A Comparison of Vocabulary Intensity Index for
Learning-Disabled Subjects in Two Studies

Age levels	<u>Andolina</u>		<u>Present study</u>	
	<u>N</u>	Mean	<u>N</u>	Mean
7.5- 9.0 years	20	0.81	--	--
9.1-10.5 years	20	0.79	18	.86
10.6-12.0 years	20	0.77	18	.84
12.1-13.5 years	20	0.75	18	.89
13.6-15.0 years	--	--	18	.89

Summary

Two major hypotheses were investigated in the present study. Hypothesis I predicted significant differences between learning-disabled and normal subjects on three measures of syntactic development, while Hypothesis II predicted significant differences between the two groups on four measures of vocabulary development. Results provided support for Hypothesis I for number of T-units and for the Syntactic Density Score. No support was evident for Hypothesis II.

In addition to the results for major hypotheses, significant differences among age levels were observed for the Syntactic Density Score and the vocabulary development indices of simple type-token ratio and corrected type-token ratio. Trend analysis conducted on each of these variables indicated a significant linear trend for the Syntactic Density Score. No significant trends were noted for the simple type-token ratio, while a significant quadratic trend was observed for the corrected type-token ratio. The pattern of a decline in scores from age level one to age level two and then increases at age levels three and four was consistent for all four measures of vocabulary. This pattern was somewhat different from previous research. Chapter V discusses these results and their implications for education and research.

DISCUSSION, IMPLICATIONS, AND RECOMMENDATIONS

Discussion of Results

From the early 1900s the need has been recognized for an accurate, reliable index of children's language. The evolution of language research has progressed from parents' observations of their children's language to highly controlled studies employing sophisticated indices of language development. The advent of controlled studies employing several measures of language came with the work of McCarthy (1930) during the Traditional Grammar Era. The work of Strickland (1962) and Loban (1963) characterized the research of the Structural Grammar Era. The majority of research concerned with language development has occurred during the Transformational Grammar Era which has reflected new, more complex measures of language and some controversy about methods.

A controversy about methods of language research emerged when Roger McCaig (1970) criticized the studies of McCarthy (1930), Templin (1957), Strickland (1962), Loban (1963), and O'Donnell, Griffin, and Norris (1967). He specifically found fault with their method of collecting

natural language samples and analyzing them afterward. He preferred the method of having an advanced list of items to inventory as carried out by Berko (1958), Brown and Bellugi (1964), and Menyuk (1963). In response, Hunt (1970) pointed out differences between studies of language acquisition and those of language development. He described the studies of the latter group as being oriented toward language acquisition, designed to analyze specific grammatical constructions. The research carried out by the former group, Hunt said, was oriented toward language development and provided descriptive information.

Almost concurrently with this debate, research was indicating that children and adolescents with learning disabilities manifest a variety of language problems. McGrady (1968) stated that the greatest prevalence of learning disabilities is that in which language is involved. More recently, Semel and Wiig (1975) reported research that showed a greater incidence of language deficits in learning-disabled children than previously had been reported.

In recent years there has been considerable research concerning language deficits of learning-disabled children using the methods advocated by both McCaig and Hunt. This research, however, has provided little agreement about the nature of the deficits. Fry (1967) and Schulte (1967) reported low fluency, vocabulary, and linguistic development. Semel and Wiig (1975) found

impaired receptive abilities. Vogel (1974) noted deficient syntax. Among learning-disabled subjects, Wiig and Semel (1975) observed limited ability to name verbal opposites, pictorial presentations, and food items; the production of shorter sentences and more agrammatical sentences; and poor vocabulary development. Wiig, LaPointe, and Semel (1977) identified reductions in morphology and syntax, and dysnomia. Andolina (1978) found more gradual rates of growth in some aspects of syntax and vocabulary in learning-disabled children than in normal children in previous studies.

Using the research strategy recommended by Hunt (1970) and the measures of syntax and vocabulary used by Andolina (1978) in a descriptive study of learning-disabled children, the present study compared the oral language of learning-disabled and normal children. The following sections discuss the results of the present study.

Syntactic Development

The results of this study indicated that the syntactic development of learning-disabled children is less well developed than the syntactic development of their peers as measured by number of T-units and Syntactic Density Score. These findings are generally consistent with the findings of Andolina (1978) who compared results from her learning-disabled population with the results of previous research using normal subjects (Ciani, 1974; Fox,

1970; O'Donnell, Griffin, & Norris, 1967). However, in the present study, differences between groups were not revealed for mean length of T-unit. This was an unexpected outcome since mean length of T-unit has been a widely accepted measure of syntactic development since the T-unit was identified by Hunt (1965) and is correlated highly with the Syntactic Density Score ($r = .88$).

Number of T-units. Learning-disabled children produced more T-units than normal children. However, it is erroneous to view these findings as suggesting superior language development for learning-disabled subjects. An inverse relationship between number of T-units and mean length of T-units exists. In language samples of approximately the same size a greater T-unit count mathematically yields lower mean length of T-unit scores. As Hunt (1965) proposed, excessive coordination of main clauses (which produces increased number of T-units) might suggest immaturity of syntactic development rather than maturity. This finding must be considered in conjunction with the finding for mean length of T-unit.

Mean length of T-unit. From the Traditional Grammar Era to the present, researchers concerned with language development have sought a reliable measure of syntactic maturity. The measures employed evolved from the simple--counting the number of words in sentences (McCarthy, 1930)--to the complex--the Syntactic Density Score (Golub & Frederick, 1971). As late as 1954, McCarthy

reiterated her belief that the mean length of sentence has no equal as a "reliable, easily determined, objective, quantitative, easily understood measure of linguistic maturity" (1954, pp. 550-551).

As theories and research about language and language development progressed into the Structural Grammar Era, Strickland (1962) and Loban (1963) disavowed sentence length as an effective measure of language maturity. These two researchers identified the phonological unit and the communication unit. These measures were described as a unit of speech ending with a distinct falling intonation which signals a terminal point, and an independent clause with its modifiers, respectively. Neither of these measures gained wide acceptance among other researchers.

During the Transformational Grammar Era, Hunt (1965) contributed to language research the identification of the minimal terminal unit (T-unit), a basic unit of expression consisting of a single main clause and the subordinate clause joined to it (Hunt, 1965, p. 20). Mean length of T-unit was utilized by O'Donnell, Griffin, and Norris (1967) and determined to be "a simple, objective, valid indicator of development in syntactic control" (pp. 98-99). This measure was also employed by Fox (1970), Ciani (1974), and Andolina (1978). Andolina found this measure to be sensitive to developmental trends across four age ranges of learning-disabled subjects. When comparing

results from her learning-disabled subjects with normal subjects from other studies, she found that the learning-disabled subjects lagged behind.

Why was significance not found between groups in the present study? To attempt to answer this question two factors should be considered. The first is the nature of the stimulus films. In previous studies (Andolina, 1978; Fox, 1970; O'Donnell, Griffin, & Norris, 1967), the stimulus films employed Aesop's fables. When subjects were asked to relate the story they had seen it is probable that these films, being animated and containing plot and moral, were likely to have stimulated more diverse and more imaginative language containing a greater number of subordinate clauses. The films utilized in the present study evoked narrative discourse in which subjects listed a series of actions performed by the person in each film. This may have generated the excessive coordination of main clauses described by Hunt as possibly immature, thereby creating short T-units. The following excerpt from the language sample of a normal child in the 12.1-13.5 age group illustrates the phenomenon just described:

Then he went out just exploring. He walked down the creek and tried to catch some minnows. He caught one, but it got loose. Then he ran. Then he saw a frog in the creek, and he ran out and caught it and got all wet. Then he went in the woods and there was a bird. Then he saw a bird fly out from under a piece of glass.

A second consideration involves the mean length of T-unit as a variable of syntactic development. A point made

by O'Donnell (1975) must be reiterated. He stated that while mean length of T-unit has value as a measure of syntactic development, it yields little indication of complexity; that is, a T-unit can be lengthened in numerous ways, some of which require more maturity than others.

Syntactic Density Score. The Syntactic Density Score yielded significant differences between learning-disabled and normal subjects and among the four age levels. Trend analysis indicated a significant linear trend among the age levels. Examination of mean scores for age levels for both groups showed greater variation than found in Andolina's (1978) results. In the Andolina study, the range of SDS scores from lowest to highest was only .06, while in the present study the range was .22 for the learning-disabled group and .43 for the normal group. Since the Andolina study and the present study are the only ones which have applied the Syntactic Density Score to oral language, further comparisons to previous research cannot be made.

Although O'Donnell (1976) expressed concern about the redundancy caused by the high correlation between mean length of T-unit and the Syntactic Density Score, this redundancy did not appear to affect the SDS scores of the present study. Significant differences between groups or among age levels were not observed for mean length of T-unit but were observed for Syntactic Density Scores. Apparently other items comprising the Syntactic Density

Score contributed to the differences. Examples are the number of gerunds, participles, and absolute phrases, and the number of prepositional phrases, both of which carry high weightings in the SDS formula.

In considering the measures of syntactic maturity employed in the present study, several cogent observations must be considered. Language development may be characterized by increased length of communication units, increased frequency of certain constructions, and similar indices; yet such numerical indices fail to be sensitive to other developmental characteristics of language such as clarity, coherence, and grammatical correctness. Myklebust (1965) remarked that a language unit can be lengthy, but grammatically and morphologically so incorrect that effective communication is hindered.

During the data collection phase of the present study, difficulties in communication frequently resulted from agrammatical construction by children. However, grammatical incorrectness was not reflected on any of the three measures of syntactic development. The following excerpt from the language sample of a nonlearning-disabled subject illustrates the lack of sensitivity of the numerical indices:

It's about this boy that went fishing and he didn't catch nothing. . . . Near about at the end, he started running through and down the stream. . . . Then he seen these ants so they was on this lizard. . . .

While highly agrammatical, this sample earned the highest Syntactic Density Score of all 144 language samples

examined. The Syntactic Density Score is a function, in part, of the other two measures of syntactic development employed in this study. Thus, while language research has progressed considerably from parents' observations of their children's language, sophisticated numerical indices of syntactic development fail to be sensitive to crucial components of effective language.

Vocabulary Development

The results of this study did not indicate significant differences between learning-disabled and normal children on any of the four measures of vocabulary employed. These findings are contrary to results reported by Fry (1967) and Schulte (1967) who observed poor vocabulary among reading-disabled subjects; Wiig and Semel (1975) who found limited ability to name verbal opposites, pictorial presentations, and food items, as well as language production characterized by restricted vocabulary development; and Wiig, LaPointe, and Semel (1977) who identified reductions in morphology and frequent dysnomia. Can the findings of the present study be accepted, or can the results be attributed to other factors? The nature of the measures of vocabulary utilized, the stimulus materials, the research strategy, and characteristics of the population will be examined in terms of the findings of this study.

Measures of vocabulary. The first variable observed was the number of word types, which is the number of different words used in a given language sample. This

measure has been utilized since McCarthy used it in her study (1930). The second variable, simple type-token ratio, is the ratio between the total number of words and the number of word types. Another variable, the corrected type-token ratio devised by Carroll (1964) was employed to minimize differences which may be caused by the varying lengths of language samples. The final variable observed was the Vocabulary Intensity Index (Kidder, 1974) which comprises the number of word types, the number of multisyllable words, the number of tokens not on the basic word list, and the number of words with affixes. These counts are totaled and divided by the total number of words to give the VII score.

One factor affecting the results for vocabulary may have been the redundancy in the measures. It is apparent that the simple and corrected type-token ratios are completely dependent on the number of word types. In addition, the Vocabulary Intensity Index is highly dependent on this count. The number of word types contributes the highest value in the VII. This observation leads to the conclusion that what is being measured by all four variables reflects the number of word types.

While number of word types is perhaps useful as a quantitative measure of vocabulary development, it is indifferent to qualitative aspects of vocabulary. For example, the word climb, used by many subjects, would earn a score equivalent to mount, scale, and ascend, all of

which are more descriptive synonyms; the word threw, also used by many subjects, has the same value as tossed, casted, flung, and hurled which reflect more sophisticated use of words.

Another concern about these particular measures of vocabulary is that they are highly influenced by stimulus materials. This topic will be discussed next.

Stimulus films. While a great degree of control was achieved by using the stimulus films employed in the present study, a disadvantage might have been that this standardization minimized the very differences being sought. For example, each film had only one person in it, limiting nouns referring to persons primarily to boy and cowboy. The continuous repetition of these nouns throughout the samples affected the number of word types, thus affecting both ratios and the VII.

In addition, the films employed did not appear to stimulate children to produce imaginative abstract language samples. Myklebust (1965) defined a dimension of language development evolving from concrete to abstract. This hierarchy represents the extent to which a language sample manifests the use of abstract ideas. The concrete-descriptive stage ranges from simple identification to use and quality of objects; the concrete-imaginative stage encompasses levels from assigning roles to persons to expressing interactions. The abstractive-descriptive level consists of steps evolving from narration relating to the

central figure to the creation of imaginative characters; the abstract imaginative level, the highest on the scale, ranges from using the plot and setting at face value to employing allegory in an imaginary setting. The stimulus films utilized appear to have elicited language samples at the first two levels rather than at the latter two, thereby possibly minimizing the more elaborative aspects of language and vocabulary. This in turn would minimize differences between the two groups. Similar concerns were expressed by Andolina (1978).

Research strategy and sample population.

To match or not to match is a dilemma faced by researchers. Matching creates greater control and minimizes the possibility that differences between groups may be explained by factors other than those being examined. If, however, the factors being matched are correlated highly with the variables being examined, possible sources of variation between groups would be controlled, thus lessening variation. Since vocabulary is a major component of most measures of intelligence, matching subjects on IQ may have decreased the likelihood of differences between the two groups. In addition, it should also be noted that mean IQ's for both groups were slightly below the norm for both learning-disabled and normal groups. The mean IQ's were 95 and 96 respectively. This situation may have caused reduced scores on vocabulary measures for both groups.

Findings from the present study revealed no differences between learning-disabled and normal groups on measures of vocabulary development, thus not supporting the results reported by Fry (1967), Schulte (1967), Wiig and Semel (1975), and Wiig, LaPointe, and Semel (1977). The research strategy employed in the present study differed from that used by the other researchers, having employed analysis of spontaneous oral language rather than measures of predetermined components of vocabulary development.

The significant differences among age levels noted for the simple type-token ratio and the corrected type-token ratio differ from previous research. The significant quadratic trend observed for the corrected type-token ratio was indicative of the pattern among the other three measures of vocabulary development, although they did not approach statistical significance. Andolina (1978) noted a significant linear trend for some measures of vocabulary development. However, she did not control for length of language sample, and perhaps her results may have been influenced by the increasing size of the language sample as age increased.

Implications

After more than a decade of research concerned with language development in learning-disabled children, there is little consensus among researchers about the characteristics of the language deficits attributed to

these children. Both constructs, language deficits and learning disabilities, are subject to widely varying definitions and descriptions. While federal guidelines for the identification of learning-disabled students exist, these are general, and specific definitions vary from state to state. The term "language deficits" is confounded not only by various definitions of language itself, but by differing opinions regarding the important components of language. When each study employs a different description of what constitutes learning disabilities and examines different aspects of language, comparisons are difficult and findings are hard to generalize. Findings from the present study indicated that learning-disabled students were deficient in syntactical development but not vocabulary development. When comparing these results with the findings from previous research, the varying definitions of learning disabilities and language deficits should be considered.

A second implication pertains to the division between researchers concerned with language acquisition and those concerned with language development, and the different research strategies advocated by each group. Some viewpoints see language development as an extension, refinement, or enhancement of language acquisition. Therefore, if the gap between these two groups of researchers were narrowed, more efficacious methods of evaluating both the acquisition and development of language could be effected and

developmental trends better noted. One way in which the gap might be lessened is for each group of researchers to utilize the qualitative-quantitative strategies employed by the other group. Language development researchers generally have examined quantitative aspects of language by looking at group differences. This method may be insensitive to the range and variation within groups. Language acquisition researchers have focused on qualitative aspects of language. For example, rather than determining only mean length of T-unit, these researchers would examine the various ways in which a child would achieve T-unit length. By employing some qualitative strategies in addition to the quantitative ones being used, language development researchers could derive more direction for instructional planning for teachers. By utilizing the strategies of language development researchers, language acquisition researchers could give quantification to developmental trends. This quantification could be useful in large scale screening and in identifying children with language-related learning disabilities. The present study employed methods advocated by researchers interested in language development, but the addition of the qualitative techniques used in language acquisition studies may have yielded additional significant findings.

Another implication evolves from the nature of language and techniques of language research. An excerpt of a language sample from the present study demonstrated how an agrammatical passage obtained a high Syntactic Density

Score. Additionally, it was shown that the measures of vocabulary used in the present study were insensitive to the descriptive quality of words. Researchers tend to evaluate language by fractionalizing it into specific, perhaps isolated, components, thereby not acknowledging that language represents a totality that is greater than the sum of its parts. As an example, a line from Shakespeare, "To be or not to be--that is the question," would achieve low scores if considered in terms of the numerical indices in the present study. Some techniques examining very specific aspects of language eclipse other characteristics, such as clarity, correctness, abstraction, and meaning.

While there is little likelihood that teachers will set out to increase mean length of T-units or Syntactic Density Scores in the language of learning-disabled children, implications for teaching can be derived from the results of the present study. Because results from the present study and research from the past indicate that learning-disabled children lag behind normal children in syntactic development, methods of advancing syntactic development should be contemplated. Hubbell (1977) reminded us that much classroom talk is teacher talk directed at children and puts restraints on children's language. Teachers of the learning disabled should strive to stimulate genuine verbal interaction between themselves and children and among children. Activities and questions

which spur a variety of linguistic structures will allow learning-disabled children both to practice new structures of their own and to be exposed to the variety of structures used by others.

A final implication of both the present study and past research concerns federal guidelines for the identification of learning-disabled children. In the Federal Register for December 29, 1977, oral language was listed as one of the seven aspects of development in which a learning-disabled child might exhibit a severe discrepancy, thus indicating identification of a specific learning disability. The syntactic measures employed in the present study differentiate between learning-disabled and normal populations, but their utility in the identification process is doubtful because they are time consuming and expensive. For these same reasons, the vocabulary measures employed would not be useful for identification purposes. The need for economical reliable strategies for identifying language-disordered, learning-disabled children presents a challenge to researchers. These strategies, when developed, would be useful in evaluating progress through the monitoring required in Public Law 94-142, Education for All Handicapped Act, 1975.

Recommendations

The following recommendations are based on the findings of the present study:

1. To match or not to match is a dilemma which each researcher must resolve. In the present study, groups were matched on several factors, including IQ. Since vocabulary is a correlate of IQ, this matching may have diminished differences between groups on measures of vocabulary. The use of subjects who are not matched for IQ is recommended for future research which seeks to compare vocabulary development in normal and learning-disabled subjects.

2. Stimulus materials and interview questions which are likely to evoke imaginative, elaborative responses should be selected. Pictures that suggest a story and films that depict stories or that are open-ended may generate more diversity in subjects' responses. Interview questions which require subjects to put themselves in the place of a character or to change the ending of a story will perhaps elicit imaginative responses.

3. The Syntactic Density Score and Vocabulary Intensity Index could be used in conjunction with other measures which indicate grammatical correctness and imaginative use of words. Syntactic Density Scores and Vocabulary Intensity Index scores could also be tested for correlation to determine the likelihood that groups of children who manifest deficiencies in one of these measures also show deficits in the other.

4. Utilizing methods advocated by language acquisition researchers, future researchers might conduct additional analysis on language samples to determine the

types and variety of constructions which contribute to T-unit production. This kind of analysis might reveal additional, more discrete differences in the language of learning-disabled and normal students.

Limitations of This Study

1. Since the operational definition of learning disabilities varies from locale to locale, generalization of the results of the present study is limited.

2. Many of the subjects used in the present study were from rural areas of Tuscaloosa County. A comparison of Ciani's (1974) rural students with urban students from other studies disclosed that Ciani's subjects achieved lower scores on some variables. Perhaps in rural populations the language development of children is not as well developed as in urban populations.

3. Approximately 250 to 275 words of each language sample were transcribed for analysis, perhaps affecting some variables influenced by length and preventing some comparisons with previous studies.

4. Matching variables that are highly related to what is being measured controls variance. A widely accepted viewpoint contends that intelligence and vocabulary are highly related; therefore, in the present study, matching subjects by IQ may have minimized vocabulary differences between groups.

Summary

The evolution of language research in the United States has progressed from parents' observations of their children's language to highly controlled studies utilizing sophisticated indices of language development. Throughout this evolution, an accurate, reliable index of language has been sought. As theories of language and language research moved into the Transformational Grammar Era, two distinct types of research emerged, one which sought specific grammatical constructions, and one which analyzed spontaneous language. Both types have been employed in research concerned with language deficits in learning-disabled children.

Research indicates that children and adolescents with learning disabilities manifest a variety of language problems. Both McGrady (1968) and Semel and Wiig (1975) reported a greater incidence of language deficits in learning-disabled children than had previously been assumed. Most research on language development has focused on the birth to eight-year age range and has examined primarily language acquisition rather than language development. Four descriptive studies of language development in children were conducted, using various measures of both syntax and vocabulary (Andolina, 1978; Ciani, 1974; Fox, 1970; O'Donnell, Griffin, & Norris, 1967). Only one of these studies involved learning-disabled children (Andolina, 1973). Andolina recommended additional research which

compared the language development of learning-disabled and normal students from the same school populations, extended the chronological age range of subjects, and employed stimulus materials which were more appropriate for intermediate- and secondary-age students.

The major purpose of this study was to compare the language development of learning-disabled and normal subjects at four different age levels--9.1 to 10.5, 10.6 to 12.0, 12.1 to 13.5, and 13.6 to 15.0. Eighteen learning-disabled subjects and 18 normal subjects at each age level were matched for school and grade placement, chronological age within 60 days, and IQ within 10 points. This procedure yielded 72 learning-disabled and 72 normal subjects.

Two films were used to elicit oral language samples. Subjects' responses were analyzed by computer according to three measures of syntax--number of T-units, mean length of T-units, and Syntactic Density Score--and four measures of vocabulary--number of word types, simple type-token ratio, corrected type-token ratio, and Vocabulary Intensity Index.

Results indicated that learning-disabled students produced more T-units than their normal peers. Since number of T-units has an inverse relationship to mean length of T-units in passages of similar length, these results suggested less mature rather than more mature development in the language of the learning-disabled subjects. The learning-disabled children additionally

achieved significantly lower Syntactic Density Scores than normal students.

Differences between groups were not achieved for any of the four measures of vocabulary employed. The measures themselves, the nature of the stimulus materials, research strategies, and characteristics of the population were cited as possible explanations for the lack of differences.

The following implications resulted from the study:

1. A lack of concensus among researchers regarding the definitions of learning disabilities and language deficits makes comparisons across studies difficult.

2. A joining of forces between advocates of language acquisition techniques and advocates of language development techniques may lead to better methods of evaluating language.

3. Numerical indices employed in the present study are not sensitive to some crucial aspects of language.

4. Results indicating that learning-disabled children are deficient in oral syntax suggest that teachers should provide more opportunities for meaningful, diverse language to occur in the classroom context.

5. While the syntactic measures employed in the present study differentiate between learning-disabled and normal students, they have little utility in identifying language-disordered, learning-disabled children.

APPENDIX A
COMPARISON OF METHODS ACROSS FIVE STUDIES

COMPARISON OF METHODOLOGIES ACROSS FIVE STUDIES

Population, location, and schools	Children	Data collection dates	Interviewers	Stimulus	Interview questions	No. of chil- dren part- icipating at one time	Language Factors Measured
O'Donnell, Griffin, & Norris (1967)	26,000 urban, white middle class, southern city, 1 public elementary-middle school, 2 private kindergartens	180, 30 at each grade (K, first, second, third, fifth, and seventh) ranging in age from 5.3 to 14.6 years	March, 1965	three housewives with elementary teaching experience	two films-- "The Ant and the Dove" and "The North Wind and the Sun" no sound	two types 1. Retell the story 2. Personal experi- ence question relating to the moral of the story	3 syntactic maturity as measured by T-units
Fox (1970)	40,000 urban, white middle-class midwestern city, 2 public elementary schools	80 children, 20 at each grade, (K, first, and third ran to age from 5.4 to 10.5 years	April, 1969	two housewives with elementary teaching experience	two films-- same as O'Donnell, Griffin, & Norris	similar to O'Donnell, Griffin, and Norris with the following modifications: 1. Child was given an opportunity to defend his/her opinion, and 2. The vocabulary was simplified	2 syntactic maturity as measured by T-units and vocabulary diversity as by the corrected type-token ratio

Ciani (1974)	2,400 rural, white middle-class mid-western town, 1 public elementary school	60 children, 20 at each grade (first, second, and third) ranging in age from 6.4 to 10.3 years	March, 1973	the investigator	one film-- "The Daisy" no sound	three types 1. Retelling of story 2. Specific questions relating to the context 3. Evaluative-- judgmental question --Did you like the story? Why?	1	syntactic maturity as measured by T-units and the Syntactic Density Score and vocabulary richness as measured by the corrected type-token ratio and the Vocabulary Intensity Index
Andolina (1978)	192,034 urban and rural white middle-class southwestern Pennsylvania county, 14 public and junior high schools	80 learning-disabled children, 20 at each age level, ranging in age from 7.5 to 13.5	October, 1977	the investigator and one substitute elementary school teacher	two films-- ~~same as~~ O'Donnell, Griffin, & Norris and Fox	Same as Fox	1	syntactic maturity as measured by T-units and the Syntactic Density Score and vocabulary richness as measured by the corrected type-token ratio and the Vocabulary Intensity Index
Present study (1979)	120,000 urban and rural white, middle-class western Alabama city and county, 22 public elementary, junior high, and high schools	72 learning-disabled and 72 normal males, 18 each at each age level, ranging from 9.0 to 15.0	April & May 1979	the investigator and six graduate students in education	two films-- "Boy's Journey Through a Day" and "Corral" no sound	Same as questions 1 and 2 used by Ciani	2	Syntactic maturity as measured by number of T-units, average number of words per T-unit, and the Syntactic Density Score, and vocabulary richness as measured by number of word types, simple type-token ratio, corrected type-token ratio, and the Vocabulary Intensity Index

APPENDIX B
PARENT PERMISSION LETTER

THE UNIVERSITY OF ALABAMA
UNIVERSITY, ALABAMA 35486

COLLEGE OF EDUCATION
AREA OF SPECIAL EDUCATION

P. O. BOX 2502

PROGRAMS IN:
MENTAL RETARDATION
EMOTIONAL CONFLICT
MULTI-DISABILITIES
DEAF EDUCATION
LEARNING DISABILITIES
DIAGNOSTICIAN TRAINING
SPECIAL EDUCATION
ADMINISTRATION
INTERRELATED PROGRAMS

Dear Parent or Guardian of _____:

Dr. Charles Sprayberry, Superintendent of Tuscaloosa County Schools has given me permission to gather data for my research project. I am a doctoral candidate at The University of Alabama studying the oral language development of children.

In order to collect information, I am requesting permission from you to obtain a spontaneous oral language sample from your child. _____ will be shown two short films. At the conclusion of each film, _____ will be asked to tell the story he/she saw. The entire session should take a maximum of 1/2 hour and will be scheduled so that your child will not miss any special classroom instruction.

The results of the research project will be sent to Dr. Sprayberry, the Superintendent and the principal of the school, and your child's teacher. The results will be available to you through the classroom teacher.

I am asking your cooperation in this study because I expect the findings to be very helpful in planning improved programs for language development in children.

Please respond to the statements on the following page and return to me in the enclosed self-addressed stamped envelope. If I do not hear from you, I will assume that my request meets with your permission. If you have any questions, please indicate so on the attached form and I will call you.

Thank you for your cooperation.

Sincerely,

Rochelle B. Simms

Rochelle B. Simms
Doctoral Student
University of Alabama

RBS/cp

Dear Ms. Simms:

	<u>YES</u>	<u>NO</u>
You have my permission to obtain a spontaneous oral language sample from my child.	_____	_____
You may have access to my child's records.	_____	_____
I have some questions and would appreciate you calling me.	_____	_____

Parent Signature

Date

Name of Child _____

Name of School _____

APPENDIX C

INFORMATION AND INSTRUCTIONS FOR THE
INVESTIGATOR AND INTERVIEWERS

PROCEDURE FOR COLLECTING LANGUAGE SAMPLE

1. When introduced to the subject, be sure that you remember his name so you can write it down. Initiate a short, friendly conversation to relax the child.
2. Before the first film, say: WE ARE GOING TO SHOW YOU A FILM LIKE THE ONES YOU MIGHT SEE ON TV OR AT THE MOVIES. THERE ARE SOME SOUNDS IN IT, BUT THERE IS NO TALKING. WHEN IT IS FINISHED, YOU WILL BE ASKED TO TELL THE STORY THAT YOU SAW. WE HOPE THAT YOU ENJOY THE MOVIE.
3. The first film will be shown and the subjects will be interviewed individually away from the projection area.
4. Turn on the tape recorder as inconspicuously as possible.
5. (Subject's name). TELL ME ABOUT THE FILM YOU HAVE JUST SEEN.
6. WOULD YOU LIKE TO ADD ANYTHING TO YOUR STORY?
7. When the subject has finished, say something positive, such as THAT WAS FINE or THAT WAS GOOD.
8. THIS MOVIE WAS ABOUT A COWBOY BREAKING IN A HORSE. THINK OF AN ANIMAL YOU WOULD LIKE TO HAVE. Pause a few seconds. TELL ME WHAT ANIMAL YOU WOULD CHOOSE AND HOW YOU WOULD BREAK IT IN.
9. When he has finished, thank him, turn off the tape recorder, and take him back to the projection area.
10. WE ARE GOING TO SHOW YOU ANOTHER MOVIE. THIS ONE, TOO, HAS SOUND BUT NO TALKING. WHEN IT IS FINISHED, YOU WILL BE ASKED TO TELL THE STORY THAT YOU SAW. WE HOPE THAT YOU ENJOY THE MOVIE.
11. The second film will be shown and the subjects again will be interviewed individually away from the projection area.
12. Turn the tape recorder on again.
13. (Subject's name). TELL ME ABOUT THE FILM YOU HAVE JUST SEEN.
14. When he stops, ask him: WOULD YOU LIKE TO ADD ANYTHING TO YOUR STORY?
15. Again say something positive if you think the subject needs to be encouraged.
16. THE MOVIE SHOWED HOW ONE BOY WANTED TO SPEND A FREE DAY. MAYBE IT WAS A SATURDAY OR A HOLIDAY FROM SCHOOL. TELL ME HOW YOU WOULD SPEND A FREE DAY IF YOU COULD DO ANYTHING YOU WANTED TO?

17. If you don't think the language sample was sufficient, ask: IS THERE ANYTHING ELSE YOU WOULD LIKE TO DO?
18. Thank the subject and send him back to his room. Turn off the tape recorder.

APPENDIX D
PROCEDURE FOR ORIENTATION MEETINGS

PROCEDURE FOR ORIENTATION MEETINGS

First Orientation Meeting

1. The investigator and interviewers met informally.
2. The role of the interviewers was explained.
3. The study was discussed in depth.
4. The two films were viewed.
5. The data collection procedures and interviewer instruction sheets were distributed and reviewed.
6. A question and answer period followed to clarify procedures.
7. Recording equipment was distributed and examined.

Second Orientation Meeting

1. Interviewers watched a demonstration of data collection procedures.
2. Investigator and interviewers discussed observations from interview procedures and discussed standardized methods of facilitating oral language.
3. Rules for punctuation sheets were distributed and reviewed.
4. Interviewers transcribed recording together to ensure consistency in punctuation.

APPENDIX E
RULES OF PUNCTUATION

RULES OF PUNCTUATION

PERIOD

1. Use a period after declarative and imperative sentences
* elliptical sentences which answer questions
(e.g., no. of course)

COMMA

1. Set off appositives.
2. Set off parenthetic expressions.
3. Set off he said or similar expression from a direct question.
4. Set off (1) yes, no, (2) introductory well, why, or now.
5. Use comma to separate words or expressions in a series.
6. Use comma between independent clauses of compound sentence if they are joined by a conjunction and, but, or, nor.
7. Use comma between statement and brief question depending on it when the subject of both statement and question is the same person or thing.
8. Use comma to separate two words or sets of figures that might otherwise be misunderstood.

SEMICOLON

1. Use semicolon to separate sentence parts of equal rank if one or more of these parts are subdivided by commas.
2. Use semicolon between the clauses of a compound sentence if they are not joined by a conjunction.

COLON

1. Use a colon to introduce a clause or statement that explains, restates, or proves the statement in the preceding clause or clauses.

QUESTION MARK

1. Use a question mark after a direct question, but not an indirect question.

EXCLAMATION POINT

1. Use after an expression of strong or sudden feeling.

QUOTATION MARKS

1. Use to enclose a direct quotation, but not to enclose an indirect quotation
 - Place period or comma inside quotation marks
 - Place semicolon or colon outside
 - Place question mark or exclamation mark outside when it is part of the quotation--otherwise outside.

APPENDIX F
SYNTACTIC DENSITY SCORE TABULATION SHEET

SYNTACTIC DENSITY SCORE

Tabulation Sheet

<u>Variable Number</u>	<u>Variable Description</u>	<u>Variable Leading</u>	<u>Frequency</u>	<u>VLXF</u>
	Total number of words		_____	
	Total number of T-units		_____	
1.	Words/T-unit	.95	X _____	_____
2.	Subordinate clauses/T-unit	.90	X _____	_____
3.	Main clause word length (mean)	.20	X _____	_____
4.	Subordinate clause word length (mean)	.50	X _____	_____
5.	Number of Modals (will, shall, can, may, must, would . . .)	.65	X _____	_____
6.	Number of Be and Have forms in the Auxiliary	.40	X _____	_____
7.	Number of Prepositional Phrases	.75	X _____	_____
8.	Number of Possessive Nouns	.70	X _____	_____
9.	Number of Adverbs of Time (when, then, once, while . . .)	.60	X _____	_____
10.	Number of gerunds, participles, and absolute phrases (unbound modifiers)	.85	X _____	_____
	Total			_____
	Syntactic Density Score (Total/No. of T-units)			_____

Grade Level Conversion Table

SDS	1.0	1.5	2.0	2.5	3.0	3.5	4.0
Grade level	1	2	3	4	5	6	7

APPENDIX G
VOCABULARY INTENSITY INDEX TABULATION SHEET

VOCABULARY INTENSITY INDEX
TABULATION SHEET

Number of Word Types = _____

Number of Multisyllable Words = _____

Number of Tokens That are Not
on Basic Word List = _____

Number of Words with Prefixes = _____

Number of Words with Suffixes = _____

Number of Words with Affixes = _____

Total = _____

Total Number of Words = _____

Simple Type-Token Ratio = _____

VII Total/Tokens

Vocabulary Intensity Index = _____

APPENDIX H

SAMPLE PRINTOUT OF TEXT, TABULATION SHEET FOR
SYNTACTIC DENSITY PRINTOUT, AND TABULATION
SHEET FOR VOCABULARY INTENSITY INDEX

SAMPLE PRINTOUT OF TEXT

IT WAS ABOUT THIS BOY WHO WENT FISHING. HE PUT HIS WORM ON, AND HE THREW IT OUT THERE. HE DIDN'T CATCH ANYTHING THE FIRST CAST, BUT THEN HE THREW IT OUT THERE AGAIN AND PUT IT IN THE ROCKS AND WENT ON TO THIS FIELD AND LAID DOWN. JUST LOOKED UP AT THE CLOUDS. HE'S DAYDREAMING ABOUT BULLS. THEN AFTER THAT, HE WENT ON. HE SAW A FROG. HE WAS CATCHING IT AND EVERYTHING TRYING TO CATCH IT. HE WAS PLAYING WITH SOME MINNOWS THAT WAS IN THE WATER. AFTER THAT HE WENT UP ON THIS HILL CLIMBING AND EVERYTHING. THEN HE SAW SOME BABY EAGLES. HE STARTED AGGRAVATING THEM. THEY STARTED HISSING AND EVERYTHING. THEN THE MAMA EAGLE WAS UP THERE, AND THEN THAT BOY HE JUST WENT ON AND JUST STARTED JUST WALKING ON THAT HILL. HE JUST KEPT WALKING THROUGH THAT VALLEY AND EVERYTHING. THEN HE SAW A LOT, A BUNCH OF FLOWERS. HE SAW A BUTTERFLY ON THEM FLOWERS. HE WAS WATCHING IT. THEN HE WENT ON THROUGH THAT FIELD RUNNING AND EVERYTHING. RUNNED THROUGH A FOREST. THEN HE CAME DOWN AND JUST FELL DOWN ON THE GROUND AND JUST WAS RESTING. THEN HE GOT BACK UP. HE STARTED WALKING BACK DOWN THERE TO WHERE HE WAS, WHERE HIS FISHING POLE WAS. HE SAW SOME A NEST IN THE GROUND. IN THE FOREST HE SAW A NEST UP ON, UP IN A TREE. HE CLIMBED A TREE AND SAW SOME BABY BIRDS IN IT. THEN, WHEN HE PULLED UP HIS FISHING POLE, HE HAD A FISH ON IT. THEN, HE PUT IT BACK OUT THERE WITH A WORM ON IT AND CAUGHT ANOTHER FISH.

SYNTACTIC DENSITY SCORE

Tabulation Sheet

<u>Variable Number</u>	<u>Variable Description</u>	<u>Variable Loading</u>	<u>Frequency</u>	<u>VLXF</u>
	Total number of words		<u>270</u>	
	Total number of T-units		<u>30</u>	
1.	Words/T-unit	.95	X <u>9.00</u>	<u>8.55</u>
2.	Subordinate clauses/T-unit	.90	X <u>0.23</u>	<u>.21</u>
3.	Main clause word length (mean)	.20	X <u>7.30</u>	<u>1.46</u>
4.	Subordinate clause word length (mean)	.50	X <u>7.29</u>	<u>3.64</u>
5.	Number of Modals (will, shall, can, may, must, would . . .)	.65	X <u>0</u>	<u>.00</u>
6.	Number of Be and Have forms in the Auxiliary	.40	X <u>10</u>	<u>3.98</u>
7.	Number of Prepositional Phrases	.75	X <u>40</u>	<u>30.00</u>
8.	Number of Possessive Nouns	.70	X <u>4</u>	<u>2.78</u>
9.	Number of Adverbs of Time (when, then, once, while . . .)	.60	X <u>13</u>	<u>7.71</u>
10.	Number of gerunds, participles, and absolute phrases (unbound modifiers)	.85	X <u>22</u>	<u>18.53</u>
	Total			<u>76.910</u>
	Syntactic Density Score (Total/No. of T-units)			<u>2.56</u>

Grade Level Conversion Table

SDS	1.0	1.5	2.0	2.5	3.0	3.5	4.0
Grade level	1	2	3	4	5	6	7

VOCABULARY INTENSITY INDEX
TABULATION SHEETNumber of Word Types = 86Number of Multisyllable Words = 41Number of Tokens That are Not
on Basic Word List = 76Number of Words with Prefixes = 3Number of Words with Suffixes = 2Number of Words with Affixes = 5Total = 208Total Number of Words = 270Simple Type-Token Ratio = .32

VII Total/Tokens

Vocabulary Intensity Index = 0.77

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